(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 May 2004 (21.05.2004)

PCT

(10) International Publication Number
WO 2004/042022 A3

(51) International Patent Classification[7]: C12N 9/00

(21) International Application Number:
PCT/US2003/034809

(22) International Filing Date: 30 October 2003 (30.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/423,226	1 November 2002 (01.11.2002)	US
60/426,713	15 November 2002 (15.11.2002)	US
60/429,766	26 November 2002 (26.11.2002)	US
60/447,043	11 February 2003 (11.02.2003)	US

(71) Applicant *(for all designated States except US)*: **INCYTE CORPORATION** [US/US]; 3160 Porter Drive, Palo Alto, CA 94304 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **HAFALIA, April, J., A.** [US/US]; 15 Midvale Drive, Santa Clara, CA 94015 (US). **LEE, Soo-Yeun** [US/US]; 40 Westdale Avenue, Daly, CA 94015 (US). **MURAGE, Jagi** [US/US]; 1025 Foxchase Drive, San Jose, CA 95123 (US). **SWARNAKAR, Anita** [CA/US]; 8 Locksley Avenue #5D, San Francisco, CA 94122 (US). **CHAWLA, Narinder, K.** [US/US]; 33 Union Square, #712, Union City, CA 94587 (US). **KHARE, Reena** [IN/US]; 12650 Orella Court, Saratoga, CA 95070 (US). **ELLIOTT, Vicki, S.** [US/US]; 3770 Polton Place Way, San Jose, CA 95121 (US). **TRAN, Uyen, K.** [US/US]; 2638 Mabury Square, San Jose, CA 95133 (US). **RAMKUMAR, Jayalaxmi** [IN/US]; 34359 Maybird Circle, Fremont, CA 94555 (US). **GURURAJAN, Rajagopal** [IN/US]; 5591 Dent Avenue, San Jose, CA 95118 (US). **BAUGHN, Mariah, R.** [US/US]; 8547 W. Horner Street, Los Angeles, CA 90035 (US). **GIETZEN, Kimberly, J.** [US/US]; 691 Los Huecos Drive, San Jose, CA 95123 (US). **YANG, Yonghong, G.** [UG/US]; 4230 Ranwick Court, San Jose, CA 95118 (US). **CHIEN, David** [US/US]; 444 Yerba Buena Avenue, Los Altos, CA 94022 (US). **WANG, Jonathan, T.** [US/US]; 173 Campbell Drive, Mountain View, CA 94043 (US). **FAVERO, Kristin, D.** [US/US]; 1660 Gordon Street #35, Redwood City, CA 94061 (US). **BECHA, Shanya, D.** [US/US]; 1 Saint Francis #5508, San Francisco, CA 94107 (US). **RICHARDSON, Thomas, W.** [US/US]; 616 Canyon Road #107, Redwood City, CA 94062 (US). **JIN, Pei** [US/US]; 320 Curtner Avenue #D, Palo Alto, CA 94306 (US). **HAWKINS, Phillip, R.** [US/US]; 750 North Shorline Boulevard #115, Mountain View, CA 94043 (US). **YUE, Henry** [US/US]; 826 Lois Avenue, Sunnyvale, CA 94087 (US). **LEE, Ernestine, A.** [US/US]; 226 Arlington Avenue, Kensington, CA 94707 (US). **MARQUIS, Joseph, P.** [US/US]; 4428 Lazy Lane, San Jose, CA 95135 (US).

(74) Agent: **FOLEY & LARDNER LLP**; Washington Harbour, 3000 K Street, N.W., Suite 500, Washington, D.C. 20007-5143 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
14 April 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: KINASES AND PHOSPHATASES

(57) Abstract: Various embodiments of the invention provide human kinases and phosphatases (KPP) and polynucleotides which identify and encode KPP. Embodiments of the invention also provide expression vectors, host cells, antibodies, agonists, and antagonists. Other embodiments provide methods for diagnosing, treating, or preventing disorders associated with aberrant expression of KPP.

WO 2004/042022 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/34809

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : C12N 9/00
US CL : 435/183
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 435/183

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EMBL; PIR, GENBANK, EST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Database UniProt Accession No. PP4L_Human. DELOUKAS et al. "The DNA sequence and comparative analysis of human chromosome 20." Nature. 2001, Vol. 414, pages 865-871, Gene Sequence.	1 and 17
X	Database GenSeq Accession No. AAB58190. RUBEN et al. "Lung cancer associated polypeptide sequence SEQ ID 528." Gene Sequence, 14 March 2001.	1 and 17
X	Database EST Accession No. AF119843. ZHANG et al. "Homo sapiens PRO1985 mRNA, complete cds." Gene Sequence, 8 May 2001.	1 and 17

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
19 January 2005 (19.01.2005)

Date of mailing of the international search report
07 FEB 2005

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (703) 305-3230

Authorized officer
Ponnathapura Achutamurthy J. Roberts for
Telephone No. (571) 272-1600

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/34809

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1,2,17,18 and 56-111, in part (SEQ ID:1)

Remark on Protest
☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

PCT/US03/34809

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

Group I, claim(s) 1, 2, 17, 18, and 56-111, drawn to a polypeptide of one of SEQ ID NO: 1-56.

Group II, claim(s) 3-7, 9, 10, 12, 13, 46, and 112-167, drawn to a polynucleotide of one of SEQ ID NO: 57-112.

Group III, claim 8, drawn to a transgenic organism comprising a polynucleotide encoding the polypeptide of one of SEQ ID NO: 1-56.

Group IV, claim(s) 11, 31, 32, and 34, 37, 38, and 40-43, drawn to an antibodiy to the polypeptide of one of SEQ ID NO: 1-56.

Group V, claim(s) 14 and 15, drawn to a method for detecting a polynucletide by hybridization with a polynucleotide of one of SEQ ID NO: 57-112.

Group VI, claim 16, drawn to a method for detecting a polynucletide by amplification with a polynucleotide derived from one of SEQ ID NO: 57-112.

Group VII, claim 19, drawn to a method of treatment using a polypeptide of one of SEQ ID NO: 1-56.

Group VIII, claims 20, 23, and 27, drawn to a method for screening for modulators of a polypeptide of one of SEQ ID NO: 1-56.

Group IX, claim 21, drawn to an agonist of a polypeptide of one of SEQ ID NO: 1-56.

Group X, claim 22, drawn to a method of treatment using an agonist of a polypeptide of one of SEQ ID NO: 1-56.

Group XI, claim 24, drawn to an antagonist of a polypeptide of one of SEQ ID NO: 1-56.

Group XII, claim 25, drawn to a method of treatment using an antagonist of a polypeptide of one of SEQ ID NO: 1-56.

Group XIII, claim 26, drawn to a method for screening for an agent that binds to a polypeptide of one of SEQ ID NO: 1-56.

Group XIV, claim 28, drawn to a method for screening for an agent that modulates the expression of a polynucleotide of one of SEQ ID NO: 57-112.

Group XV, claim 29, drawn to a method for screening the toxicity of a test compound using hybridization with the polynucleotide SEQ ID NO: 57-112.

Group XVI, claim 30, drawn to a method for diagnosis using an antibody to a polypeptide of one of SEQ ID NO: 1-56.

Group XVII, claim(s) 33 and 35, drawn to a method for diagnosis comprising administering an antibody to a polypeptide of one of SEQ ID NO: 1-56.

Group XVIII, claim 36, drawn to a method for preparing a polyclonal antibody to a polypeptide of one of SEQ ID NO: 1-56.

Group XIX, claim 39, drawn to a method for preparing a monoclonal antibody to a polypeptide of one of SEQ ID NO: 1-56.

Group XX, claim 44, drawn to a method for detecting a polypeptide using an antibody to a polypeptide of one of SEQ ID NO: 1-56.

Group XXI, claim 45, drawn to a method for purifying a polypeptide using an antibody to a polypeptide of one of SEQ ID NO: 1-56.

Group XXII, claim 47, drawn to a method for generating an expression profile using a polynucleotide of one of SEQ ID NO: 57-112.

INTERNATIONAL SEARCH REPORT

Group XXIII, claim 48-55, drawn to an array using a polynucleotide of one of SEQ ID NO: 57-112.

For each of Groups I- XXIII above, election of the following is also required. Therefore, election is required of one of Groups I-XXIII and one of inventions (A)-(DDD).

(A). SEQ ID No: 1 or a sequence encoding SEQ ID No: 1.
(B). SEQ ID No: 2 or a sequence encoding SEQ ID No: 2.
(C). SEQ ID No: 3 or a sequence encoding SEQ ID No: 3.
(D). SEQ ID No: 4 or a sequence encoding SEQ ID No: 4.
(E). SEQ ID No: 5 or a sequence encoding SEQ ID No: 5.
(F). SEQ ID No: 6 or a sequence encoding SEQ ID No: 6.
(G). SEQ ID No: 7 or a sequence encoding SEQ ID No: 7.
(H). SEQ ID No: 8 or a sequence encoding SEQ ID No: 8.
(I). SEQ ID No: 9 or a sequence encoding SEQ ID No: 9.
(J). SEQ ID No: 10 or a sequence encoding SEQ ID No: 10.
(K). SEQ ID No: 11 or a sequence encoding SEQ ID No: 11.
(L). SEQ ID No: 12 or a sequence encoding SEQ ID No: 12.
(M). SEQ ID No: 13 or a sequence encoding SEQ ID No: 13.
(N). SEQ ID No: 14 or a sequence encoding SEQ ID No: 14.
(O). SEQ ID No: 15 or a sequence encoding SEQ ID No: 15.
(P). SEQ ID No: 16 or a sequence encoding SEQ ID No: 16.
(Q). SEQ ID No: 17 or a sequence encoding SEQ ID No: 17.
(R). SEQ ID No: 18 or a sequence encoding SEQ ID No: 18.
(S). SEQ ID No: 19 or a sequence encoding SEQ ID No: 19.
(T). SEQ ID No: 20 or a sequence encoding SEQ ID No: 20.
(U). SEQ ID No: 21 or a sequence encoding SEQ ID No: 21.
(V). SEQ ID No: 22 or a sequence encoding SEQ ID No: 22.
(W). SEQ ID No: 23 or a sequence encoding SEQ ID No: 23.
(X). SEQ ID No: 24 or a sequence encoding SEQ ID No: 24.
(Y). SEQ ID No: 25 or a sequence encoding SEQ ID No: 25.
(Z). SEQ ID No: 26 or a sequence encoding SEQ ID No: 26.
(AA). SEQ ID No: 27 or a sequence encoding SEQ ID No: 27.
(BB). SEQ ID No: 28 or a sequence encoding SEQ ID No: 28.
(CC). SEQ ID No: 29 or a sequence encoding SEQ ID No: 29.
(DD). SEQ ID No: 30 or a sequence encoding SEQ ID No: 30.
(EE). SEQ ID No: 31 or a sequence encoding SEQ ID No: 31.
(FF). SEQ ID No: 32 or a sequence encoding SEQ ID No: 32.
(GG). SEQ ID No: 33 or a sequence encoding SEQ ID No: 33.
(HH). SEQ ID No: 34 or a sequence encoding SEQ ID No: 34.
(II). SEQ ID No: 35 or a sequence encoding SEQ ID No: 35.
(JJ). SEQ ID No: 36 or a sequence encoding SEQ ID No: 36.
(KK). SEQ ID No: 37 or a sequence encoding SEQ ID No: 37.
(LL). SEQ ID No: 38 or a sequence encoding SEQ ID No: 38.
(MM). SEQ ID No: 39 or a sequence encoding SEQ ID No: 39.
(NN). SEQ ID No: 40 or a sequence encoding SEQ ID No: 40.
(OO). SEQ ID No: 41 or a sequence encoding SEQ ID No: 41.
(PP). SEQ ID No: 42 or a sequence encoding SEQ ID No: 42.
(QQ). SEQ ID No: 43 or a sequence encoding SEQ ID No: 43.
(RR). SEQ ID No: 44 or a sequence encoding SEQ ID No: 44.
(SS). SEQ ID No: 45 or a sequence encoding SEQ ID No: 45.
(TT). SEQ ID No: 46 or a sequence encoding SEQ ID No: 46.
(UU). SEQ ID No: 47 or a sequence encoding SEQ ID No: 47.
(VV). SEQ ID No: 48 or a sequence encoding SEQ ID No: 48.
(WW). SEQ ID No: 49 or a sequence encoding SEQ ID No: 49.
(XX). SEQ ID No: 50 or a sequence encoding SEQ ID No: 50.
(YY). SEQ ID No: 51 or a sequence encoding SEQ ID No: 51.
(ZZ). SEQ ID No: 52 or a sequence encoding SEQ ID No: 52.
(AAA). SEQ ID No: 53 or a sequence encoding SEQ ID No: 53.
(BBB). SEQ ID No: 54 or a sequence encoding SEQ ID No: 54.
(CCC). SEQ ID No: 55 or a sequence encoding SEQ ID No: 55.

(DDD).SEQ ID No: 56 or a sequence encoding SEQ ID No: 56. The inventions listed as Groups I-XXIII and (A)-(DDD) do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The inventions listed as Group I- XXIII and (A)-(DDD) do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical feature for the following reasons: The technical feature linking Group I- XXIII and (A)-(DDD) appears to be that they all relate to enzymes that regulate the phosphorlation state of a protein substrate, i.e. kinases and phosphatases. However, kinases and phosphatases are well known in the art (Stryer, 1995 Biochemistry, 4th Ed. Freedman & Co, NY, NY, pp 244-255). Therefore Groups I-XXIII and (A)-(DDD) share no special technical feature as defined by PCT Rule 13.2, as it does not define a contribution over the prior art. Furthermore, the products of Groups I-IV, IX, XI, XXIII, and (A)-(DDD) do not share a special common structural or functional feature while, the methods of Groups V-VIII, X, and XII-XXII do not use the same reagents and/or produce the same results. In addition, the methods of Groups V-VIII, X, and XII-XXII not do comprise all of the methods for making or using the products of Groups I-IV, IX, XI, XXIII, and (A)-(DDD). Accordingly, Group I- XXIII are not so linked by the same or a corresponding special technical feature as to form a single general inventive concept.